



## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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<p>(21) International Application Number: PCT/DK90/00160</p> <p>(22) International Filing Date: 21 June 1990 (21.06.90)</p> <p>(30) Priority data: 3112/89 22 June 1989 (22.06.89) DK</p> <p>(71)(72) Applicant and Inventor: KORNBEK, Erik [DK/DK]; Møllegade 73, DK-6310 Broager (DK).</p> <p>(74) Agent: SKØTT-JENSEN, K.; Lemmingvej 225, DK-8361 Hasselager (DK).</p> <p>(81) Designated States: AT, AT (European patent), AU, BB, BE (European patent), BF (OAPI patent), BG, BJ (OAPI pa- tent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE*, DE (European patent)*, DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), HU, IT (Eu- ropean patent), JP, KP, KR, LK, LU, LU (European pa- tent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU, TD (OAPI patent), TG (OAPI patent), US.</p>		<p>Published With international search report. In English translation (filed in Danish).</p>
<p>(54) Title: AN ARCHERY TARGET AND A CENTER ELEMENT THEREFOR</p> <p>(57) Abstract</p> <p>An archery target with a frame and with a target material of foam is made of rectangular modular blocks (14) having projecting middle ribs (16) and/or middle grooves (20) along their edge surfaces, such that these blocks can be juxtaposed in a stabilized manner to form a large target body. Correspondingly the frame (2) is designed with inner holding ribs (12) and, optionally, with grooves (10), and the frame is made so as to be easy to separate and assemble. It is obtained that a large target can be packed in a compact manner for easy transportation and that it is possible to change out a worn center element of the target merely by changing the positions of the modular blocks.</p>		

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An archery target and a center element therefor.

The present invention relates to an archery target having a frame surrounding a target body and preferably being connected or connectable with a support chassis for free positioning of the target on a floor or on the ground. Previously round straw targets were used frequently, where the target body was a self carrying element that could be placed on a carrier chassis, but today the preferred targets are made of plastic foam, which normally requires a supporting frame.

Normally the targets are subject to frequent transportation, and since they are normally quite big, e.g. 125 x 125 cm, they are rather difficult to handle for the users, e.g. when transported in private cars between home and shooting area or sometimes over longer distances between home or club and a competition shooting area. Most of the users will have to place the large target of a roof carrier, which may involve considerable problems.

It is the purpose of the invention to provide such a target, which is easy to transport and which offers further advantages of use.

The target according to the invention is characteristic in being divided into modular blocks which, in a mutually stabilized manner, can be joined into a full target body and can also be connected with a stable, but separable frame and then again be separated or laid together into a compact shape for transportation. The assembled frame may be stable enough to form part of the support chassis, such that the latter may just consist of a pair of side support elements, which may be secured to opposite sides of the frame, whereby also the chassis portions can be packed in a compact manner.

The module blocks can be packed together in more

layers, and by way of example it can be achieved hereby that a complete target system with target body and carrier chassis, with a target body of 125 x 125 cm, can be packed into a compact size of some 135 x 60 x 60 cm, this size of packing being much easier to transport.

The separation of the target body in modular blocks, e.g. in 3 x 3 blocks with a side length of approximately 40 cm, involves a considerable advantage in use, namely in that it becomes possible to carry out interchangings between the different partial areas of the target body; in use of the target, of course, it is particularly the central area that is exposed to demolition as a result of the many arrow hits, and even though it is already known that it is possible to make use of separately exchangeable center areas, it will be easier and in the long run also cheaper when according to the invention the module blocks may be assembled in such an alternating manner that different blocks are used in the central area, whereby the wear on the target body will be gradually distributed all over its surface despite the actual wear being concentrated in the central area. Each purchased target will thus have a relatively long lifetime without any need for the user to additionally buy special center elements, and moreover the user will enjoy the advantage of the target being quit easy to transport through its entire lifetime.

However, nothing prevents the use of special center modules in connection with the target according to the invention, as it is perfectly possible to produce special modules for application as center parts, e.g. exhibiting an extra marked arrow braking effect for achieving an extra easy retractability of the arrows or, respectively, for achieving an extra long lifetime of just this heavily loaded area, and in connection with the invention it will be natural, then, that this special module be shaped as a whole block module and not as

a specially designed, e.g. circular cylindrical center part for being received in an associated, particular center module of the target body.

In the following the invention is described in more detail with reference to the drawing, in which:

Fig. 1 is a perspective view of connected parts of a target according to the invention,

Fig. 2 is a plan front view of such a target,

Fig. 3 is a side view thereof, partly in section,

Fig. 4 is a front view of a modified target according to the invention,

Fig. 5 is a perspective view of a further modified target shown in a separated condition,

Fig. 6 is a sectional view of an element in the target, and

Fig. 7 and 8 are plan views of modified targets.

In Fig. 1 is shown the single parts, of which a target according to the invention may consist. The parts comprise a frame element 2 consisting of single frame pieces 4, which are adapted to be assembled in any suitable manner and in a rigid and yet easily separable manner at the frame corners, e.g. with the use of clamps 6 with associated clamping screws 8. The upper and the left frame piece 4 are provided with grooves 10 in the inner surface, while the lower and the right frame piece are correspondingly provided with inwardly protruding ribs 12.

Inside the frame 2, see also Fig. 2, is mounted a number of target plate module elements 14, which are each shaped as a plate with a projecting edge rib 16 along its upper edge and a similar edge rib 18 along its left edge, while along their right hand edge they are provided with a corresponding groove 20, which continues in a similar groove 22 along the lower edge of these elements 14.

The module elements 14 consist of a disc material

suitable for the specific purpose, preferably a plastic foam, which in a simple manner is manufactured by moulding with the particular shape. It will be understood that the elements 14 may then be assembled, mutually anchored, into a larger plate element, which is closely surrounded by the frame 2, the inner protrusions 12 and grooves 10 thereof cooperating with the corresponding grooves 20,22 and ribs 16,18 of the outermost module elements 14.

When the module elements 14 are tightened in the assembled frame 2 they will constitute a coherent target member, which is coherent without requiring any separate support plate. The target, therefore, will need no backing plate, and this is decisive for the target shown being able to be packed in a compact manner.

The side pieces of the frame are prepared for external reception of foldable chassis portions 24, which can be tightened against the side pieces and determine the sloping of the erected target. The frame can be included in the very chassis construction, such that it is sufficient to work with loose side chassis portions 24. These should not be particularly long, as the target may be placed in a relatively low position. In the large picture of Fig. 3 the chassis is shown from the side, while another and in practice preferred embodiment is shown in the small picture in the same figure.

In Fig. 2 the target is shown in an assembled and erected position, comprising 3 x 3 uniform modular elements, designated A-I, the module E representing the center of the target, which may be marked e.g. by an adhering label 26. Since the user is not bound beforehand to use any particular module for the target center it is possible, as mentioned, to make use of any of the modules for this purpose, e.g. by consequently assembling the target with the least worn module in the middle.

Even though the joints between the modules 14 can

be regarded as fully homogeneous it should be avoided, nonetheless, that joints occur just across the central portion, and consequently use should be made of an uneven number of rows and columns of modular elements, when these are uniformly shaped. In the example shown in Fig. 4 only a single row of three oblong module elements is used, and it will be clear that within the scope of the invention it is possible to use several different configurations of elements.

As mentioned, it will be possible to make use of or to procure a special center element (E), which, in a suitable and more expensive manner, is particularly built for this purpose, e.g. in being particularly resistant against demolition or in giving rise to a short braking length for the arrows and thereby secure an easy retractability of the arrows. It is actual that these abilities should be found in a circular central area, but in connection with the invention, of course, a special center element can be used, having the same modular shape as the other elements, such that it can take part in the joining and separation just as the other elements.

In the embodiment shown in Fig. 5 the frame pieces 4 are engaging with grooves 20 of the target elements all the way round, and the clamps 8 are made as truck body clamps cooperating with holding hooks 9 at the ends of the adjacent frame pieces. Easily operable rotation locks 13 are mounted on the chassis portions 24 at the sides of the frame. Only the central element E has a square shape, i.e. at this place the other modules cannot be inserted as a central element, but the user can procure, easily and at a low price, some further center modules, whereby the user will be served for a long time.

It is important that the module elements in their assembled condition form a self stabilized target body,

and for achieving suitable characteristics it has been found advantageous to produce the target as a laminated structure of foam plastic, as illustrated in Fig. 6. The outer layers 28 may have a density somewhat higher than than for the inner layers 26, e.g. some 30-45 kg/m<sup>3</sup>, whereby the disc will be suitably stiff and still light; the thickness may be some 10 cm. The cross profile of the elements is brought about by mechanical working of element members formed by cutting out from a large laminate element.

The invention is not limited to embodiments shown, as the module elements may have other shapes and cross sectional profiles, just as the frame may be hinged in three of its corners for being folded together in its own plane, whereby a locking coupling should be provided only at the fourth corner. From a transportation point of view it will be an improvement already if the frame is foldable about a horizontal or vertical middle line. Moreover, the frame (and the module elements) should not necessarily be four-sided.

The invention will also comprise certain variants which will not necessarily be particularly attractive, e.g. the use of a module divided target, in which the modules with the use of connector portions e.g. of flexible foam material are hingedly connected with each other at the front or rear side, such that they can be folded together cascadeswise; thus, in the example shown in Fig. 4 one side area of the target can be folded to the rear side of the center area while the other side area can be folded inwardly over the front side of the center area for forming a compact package.

In Fig. 7 is illustrated a preferred embodiment of a large target, comprising 3 x 3 square elements 30 and two elongated side elements 32 and two elongated elements 34 at the top and bottom of the target, respectively. All these elements are consequently shaped with



middle grooves all the way round, whilst for the mutual joining of the elements separate connector lists 36, likewise of a foam material, are used. Correspondingly the outer frame is shaped with inwardly protruding middle ribs 12 all the way round.

In Fig. 8 is shown a corresponding target, only made with half the height. Here only three potential center elements 30 will be present.

Optionally the frame 2 can be made with inwardly protruding edge flanges for guidingly receiving the entire edge area of the outer sides of the module blocks.

## C L A I M S :

1. An archery target having a frame surrounding a target body and preferably being connected or connectable with a support chassis for free positioning of the target on a floor or on the ground, said target body entirely or predominantly consisting of a plastic foam, characterized in that the target body is divided in self carrying modular blocks, which in a mutually stabilized manner are joinable into a full target body, whilst along their outer sides of the target body they can engage in a stabilized manner the inner side of the surrounding frame, which is made so as to be separable or foldable together.

2. A target according to claim 1, characterized in that more of the applied modular blocks are of equal size and design so as to be mountable as a central and a non-central block element, respectively.

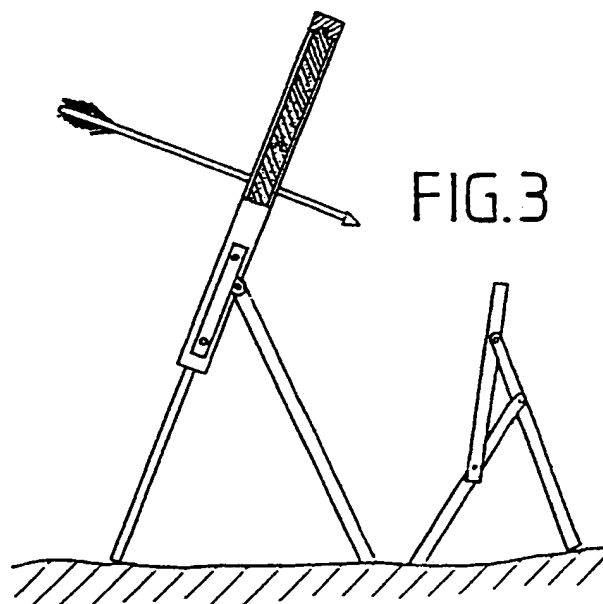
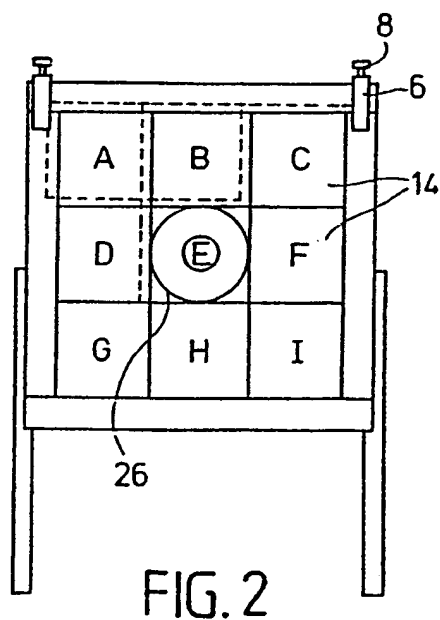
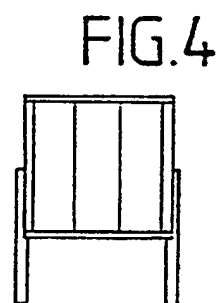
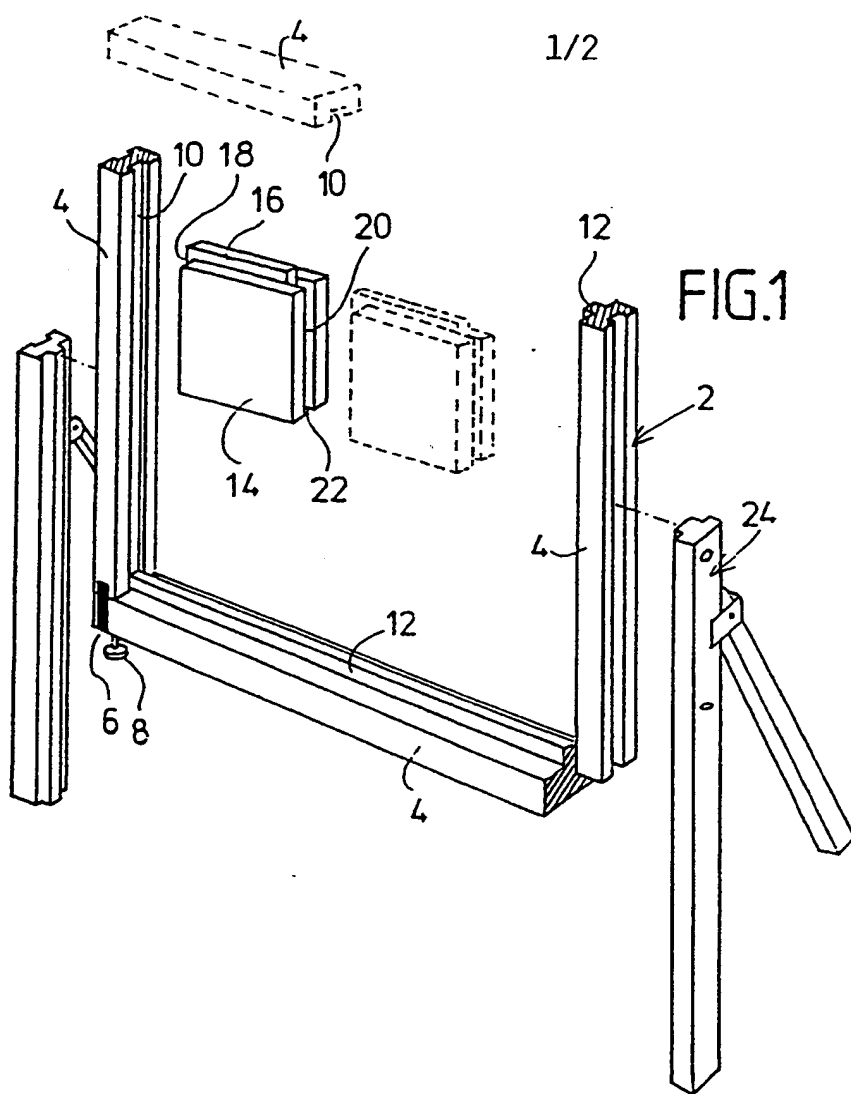
3. A target according to claim 1, characterized in that each of the modular blocks is provided with protruding middle protrusions along two sides and with inner middle grooves along the other two sides.

4. A target according to claim 1, characterized in that each of the module blocks is provided with through-going middle grooves along all of the outsides of the module and that for the mutual stabilization of the modules there is used plastic foam lists protruding into the respective neighboring grooves of the module blocks.

5. A target according to claim 4, characterized in that the frame pieces are all provided with an inwardly protruding middle rib.

6. A center element for a target according to claim 1, provided as a specially prepared disc portion having properties deviating from the other parts of the target,

characterized in that the center element is made as a block portion having a rectangular plate form and along its circumference being shaped with a groove and/or rib system for stabilized coupling with surrounding modular blocks of the target.



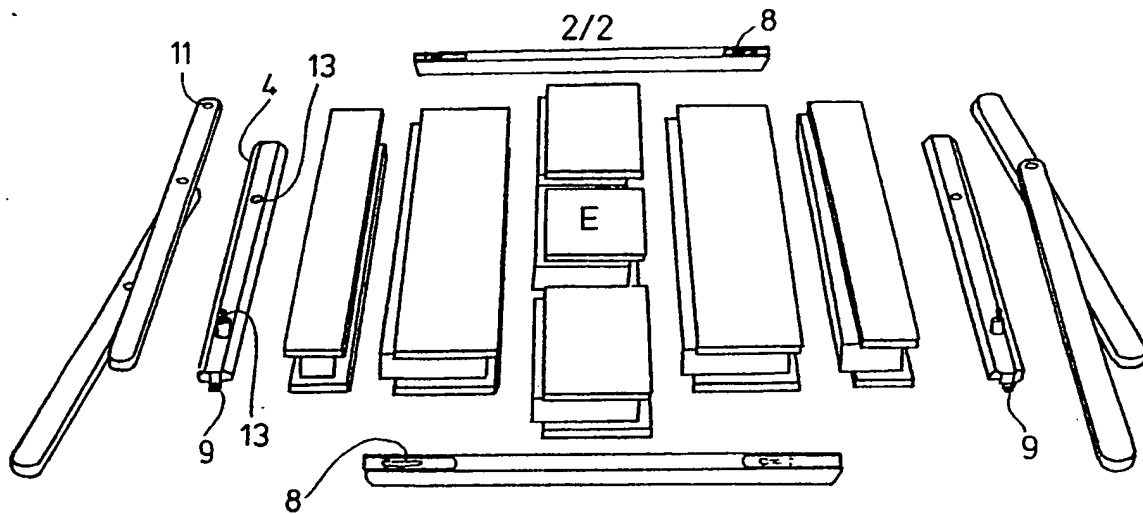


FIG.5

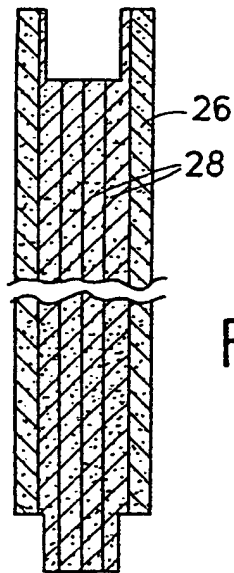


FIG.6

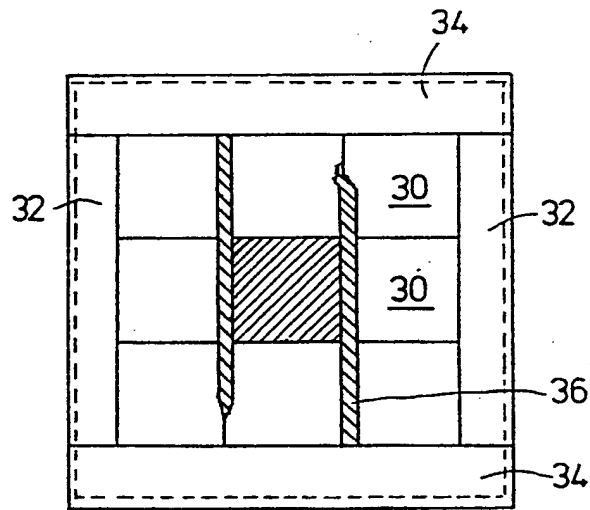


FIG.7

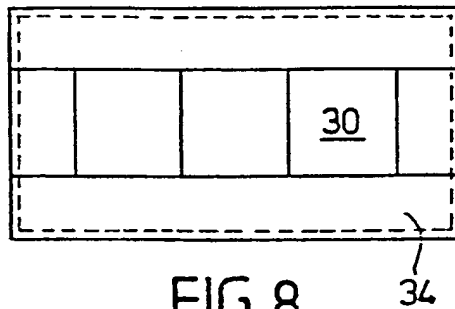


FIG.8

# INTERNATIONAL SEARCH REPORT

International Application No PCT/DK 90/00160

<b>I. CLASSIFICATION OF SUBJECT MATTER</b> (if several classification symbols apply, indicate all) <sup>6</sup> According to International Patent Classification (IPC) or to both National Classification and IPC <b>IPC5: F 41 J 3/00</b>						
<b>II. FIELDS SEARCHED</b> <div style="text-align: center; border: 1px solid black; padding: 2px;">Minimum Documentation Searched<sup>7</sup></div> <table style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 20%; border: 1px solid black; padding: 2px;">Classification System</th> <th style="border: 1px solid black; padding: 2px;">Classification Symbols</th> </tr> <tr> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">IPC5</td> <td style="border: 1px solid black; padding: 5px; vertical-align: top;">F 41 J</td> </tr> </table> <div style="text-align: center; border: 1px solid black; padding: 2px;">Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in Fields Searched<sup>8</sup></div>			Classification System	Classification Symbols	IPC5	F 41 J
Classification System	Classification Symbols					
IPC5	F 41 J					
SE,DK,FI,NO classes as above						
<b>III. DOCUMENTS CONSIDERED TO BE RELEVANT<sup>9</sup></b>						
Category <sup>*</sup>	Citation of Document, <sup>11</sup> with indication, where appropriate, of the relevant passages <sup>12</sup>	Relevant to Claim No. <sup>13</sup>				
X	FR, A1, 2571487 (DEFERT A.P) 11 April 1986, see the whole document --	1,3,6				
X	US, A, 4076246 (MEYER) 28 February 1978, see the whole document --	1,2,3				
A	US, A, 3512778 (H.W. ALLEN) 19 May 1970, see the whole document --					
A	EP, A2, 0070207 (BERNAERT, P.) 19 January 1983, see the whole document --  -----					
<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p><sup>*</sup> Special categories of cited documents: <sup>10</sup></p> <p><sup>"A"</sup> document defining the general state of the art which is not considered to be of particular relevance</p> <p><sup>"E"</sup> earlier document but published on or after the international filing date</p> <p><sup>"L"</sup> document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p><sup>"O"</sup> document referring to an oral disclosure, use, exhibition or other means</p> <p><sup>"P"</sup> document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p><sup>"T"</sup> later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p><sup>"X"</sup> document of particular relevance, the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p><sup>"Y"</sup> document of particular relevance, the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p><sup>"&amp;"</sup> document member of the same patent family</p> </div> </div>						
<b>IV. CERTIFICATION</b>						
Date of the Actual Completion of the International Search <b>14th September 1990</b>		Date of Mailing of this International Search Report <div style="text-align: center;">1990-09-25</div>				
International Searching Authority <div style="text-align: center;"><b>SWEDISH PATENT OFFICE</b></div>		Signature of Authorized Officer <div style="text-align: center;">Christer Wendenius</div>				

**ANNEX TO THE INTERNATIONAL SEARCH REPORT  
ON INTERNATIONAL PATENT APPLICATION NO.PCT/DK 90/00160**

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.  
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A1- 2571487	86-04-11	NONE	
US-A- 4076246	78-02-28	BE-A- 836783	76-04-16
		DE-A- 2557153	76-06-24
		GB-A- 1528630	78-10-18
		JP-A- 51099898	76-09-03
US-A- 3512778	70-05-19	NONE	
EP-A2- 0070207	83-01-19	FR-A-B- 2506004	82-11-19